

ABSTRACT OF THE DISCLOSURE

Chrome, nickel, titanium or zirconium films; or combinations of those four metals, or a nitride, carbide or nitroxide of one of those four metals are deposited directly on unplated zinc or unplated zinc alloy substrates by physical vapor deposition in vacuum reactors. The nitroxides films have essentially the same colors as the nitrides but can have high electrical resistivities, transparency and other nonmetallic properties.